IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS

In re application of:	
Persson et al.	Examiner: Dipakkumar B. Gandhi
Application No: 09/817,731	Art Unit: 21117
Filed: March 26, 2001	Confirmation No.: 9458
For: METHOD AND APPARATUS FOR INCREASING THE EFFECTIVE RANGE OF A COMMUNICATION LINK IN A WIRELESS COMMUNICATION SYSTEM	

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Assistant Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF
IN SUPPORT OF APPELLANT'S APPEAL
TO THE BOARD OF PATENT APPEALS

Applicants (hereinafter "Appellants") hereby submit this Brief in support of an Appeal from a decision of a Final Office Action mailed March 2, 2007, for the above-referenced case. Appellants respectfully request consideration of the accompanying Appeal by the Board of Patent Appeals for allowance of the invention as presently recited in the claims.

FILED VIA EFS WEB October 15, 2007

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I. REAL PARTY IN INTEREST

The real party in interest of the above-referenced U.S. Patent application is ArrayComm LLC of 2480 N. First Street, Suite 200, San Jose, CA 95131-1014, to whom the application has been assigned.

II. RELATED APPEALS AND INTERFERENCES

To the best of Appellants' knowledge, there are no prior or pending appeals, interferences, or judicial proceedings related to the subject matter of this appeal that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-40 have been canceled in the above-referenced application.

Claims 41-71 are pending in the above-referenced application.

Claims 41-71 were finally rejected in the Final Office Action mailed March 2, 2007. These claims are the subject of this Appeal.

IV. STATUS OF AMENDMENTS

In response to the Final Office Action mailed March 2, 2007, Appellant filed a Pre-Appeal Brief Request for Review concurrently with a Notice of Appeal on June 4, 2007, which was entered June 4, 2007.

In response to Appellant's Notice of Appeal and Pre-Appeal Brief Request for Review, a Notice of Panel Decision from Pre-Appeal Brief Review was mailed September 13, 2007.

This Brief is submitted in response to the Panel Decision.

A copy of all claims on appeal is attached hereto as Appendix A.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claims are summarized as follows. In the summary below, the referenced portion of the Specification should be construed as only representative of the teachings that support the claimed feature(s). Thus, the cited portions are sufficient to support the claim, but are not necessarily the exclusive support in the Specification for such claim features. The arguments below focus mainly on the pending independent claims. The arguments made with respect to these claims are equally applicable to the remaining claims.

For ease of review, the claims are out of numeric order below, grouping claims according to arguments made below in the Arguments section.

41. (Previously Presented) A method comprising:

determining that an effective signal strength of a signal on a wireless communication link using signal diversity in one or more of the space, time, or frequency domains is insufficient to provide a desired communication range; (Fig. 1; p. 9, lines 9 to 25; p. 11, line 16 to p. 12, line 9; Fig. 6; p. 23, line 20 to p. 25, line 5)

introducing signal diversity in an additional of the space, time, or frequency domains into the wireless communication link in response to the determining to generate multiple decorrelated signals corresponding to the signal on the wireless communication link; and (Fig. 6; p. 18, lines 1 to 14; p. 23, line 20 to p. 25, line 5)

selectively combining the decorrelated signals and demodulating the combined, decorrelated signals to generate a representation of the content of the signal. (Fig. 6; p. 15, lines 10 to 16; p. 21, lines 5 to 12)

42. (Previously Presented) A method comprising:

providing a wireless communication link with a level of diversity; (Fig. 1; p. 9, lines 9 to 25; p. 11, line 16 to p. 12, line 9)

detecting a degradation of signal quality on the wireless communication link; and (Fig. 6; p. 23, line 20 to p. 25, line 5)

dynamically introducing additional diversity on the wireless communication link to result in the wireless communication link having diversity in two or more of the space, time, or

frequency domains in response to detecting the degradation of signal quality, to generate a plurality of decorrelated signals to be selectively combined with at least the use of a weight vector and demodulated to provide a representation of an originally transmitted signal. (Fig. 6; p. 18, lines 1 to 14; p. 23, line 20 to p. 25, line 5; p. 15, lines 10 to 16; p. 21, lines 5 to 12)

55. (Previously Presented) An article of manufacture comprising a machine accessible storage device having a plurality of executable instructions which, when executed, cause the executing machine to perform operations including:

providing a wireless communication link with a level of diversity; (Fig. 1; p. 9, lines 9 to 25; p. 11, line 16 to p. 12, line 9)

detecting a degradation of signal quality on the wireless communication link; and (Fig. 6; p. 23, line 20 to p. 25, line 5)

dynamically introducing additional diversity on the wireless communication link to result in the wireless communication link having diversity in two or more of the space, time, or frequency domains in response to detecting the degradation of signal quality, to generate a plurality of decorrelated signals to be selectively combined with at least the use of a weight vector and demodulated to provide a representation of an originally transmitted signal. (Fig. 6; p. 18, lines 1 to 14; p. 23, line 20 to p. 25, line 5; p. 15, lines 10 to 16; p. 21, lines 5 to 12)

58. (Previously Presented) A wireless communication system element comprising:

a transceiver to establish a wireless communication link over which to transmit and receive wireless communication signals in a wireless communication session with a different system element; and (Fig. 1; p. 9, lines 9 to 25; p. 11, line 16 to p. 12, line 9)

a multidimensional diversity agent, coupled to the transceiver, to detect a degradation of signal quality on the wireless communication link, and in response to detecting the degradation of signal quality, selectively introduce additional diversity on the wireless communication link to result in the wireless communication link having diversity in two or more of the space, time, or frequency domains to generate a plurality of decorrelated signals, to selectively combine with at least the use of a weight vector the decorrelated signals, and to demodulate the combined signals to provide a representation of an originally transmitted signal. (Fig. 6; p. 18, lines 1 to 14; p. 23, line 20 to p. 25, line 5; p. 15, lines 10 to 16; p. 21, lines 5 to 12)

67. (Previously Presented) A method comprising:

determining that an effective signal strength of a signal on a wireless communication link using a level of signal diversity is insufficient to provide a desired communication range for the signal on the wireless communication link; and (Fig. 1; p. 9, lines 9 to 25; p. 11, line 16 to p. 12, line 9; Fig. 6; p. 23, line 20 to p. 25, line 5)

dynamically introducing an additional level of signal diversity into the wireless communication link in response to determining that the effective signal strength of the signal is insufficient, to generate additional decorrelated signals corresponding to the signal on the wireless communication link that provides a representation of the content of the signal to a receiver. (Fig. 6; p. 15, lines 10 to 16; p. 21, lines 5 to 12)

46. (Previously Presented) A method according to claim 42, wherein introducing additional diversity comprises:

communicating on a first channel of the wireless communication link; (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

determining whether a second channel is available on the wireless communication link to support repetition coding; and (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

invoking repetition coding to transmit a repetition coded signal on the first channel and on the second channel of the wireless communication link to provide channel diversity. (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

57. (Previously Presented) An article of manufacture according to claim 55, wherein introducing additional diversity comprises:

communicating on a first channel of the wireless communication link; (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

determining whether a second channel is available on the wireless communication link to support repetition coding; and (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

invoking repetition coding to transmit a repetition coded signal on the first channel and on the second channel of the wireless communication link to provide channel diversity. (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

61. (Previously Presented) A wireless communication system element according to claim 58, the agent to introduce additional diversity comprises the agent to:

determine whether an additional channel is available on the wireless communication link to support repetition coding; and (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

invoke repetition coding to transmit a repetition coded signal on the additional channel to provide channel diversity with an original communication channel on the wireless communication link. (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

71. (Previously Presented) A method according to claim 67, wherein introducing an additional level of diversity comprises:

communicating on a first channel of the wireless communication link; (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

determining whether a second channel is available on the wireless communication link to support repetition coding; and (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

invoking repetition coding to transmit a repetition coded signal on the first channel and on the second channel of the wireless communication link to provide channel diversity. (Fig. 7; p. 18, lines 1 to 14; p. 25, line 6 to p. 26, line 25)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

CLAIM REJECTIONS UNDER 35 U.S.C. § 103

Claims 41, 67, and 69 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,356,528 of Lundby et al. (hereinafter "Lunby") in view of U.S. Patent No. 5,461,646 of Anvari (hereinafter "Anvari").

Claims 42 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lunby and Anvari in further view of U.S. Patent No. 5,369,412 of Tsujimoto (hereinafter "Tsujimoto").

Claim 43 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of U.S. Patent No. 6,643,494 of Worthy (hereinafter "Worthy").

Claims 44 and 58-59 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of U.S. Patent No. 6,591,382 of Molloy et al. (hereinafter "Molloy").

Claims 45 and 60 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of Molloy and U.S. Patent No. 5,722,051 of Agrawal et al. (hereinafter "Agrawal").

Claims 46-51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of U.S. Patent No. 6.052,594 of Chuang et al. (hereinafter "Chuang") and U.S. Patent No. 6,170,075 B1 of Schuster et al. (hereinafter "Schuster").

Claims 52-54 and 65 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of Chuang, Schuster, U.S. Patent No. 3,195,049 of Altman et al. (hereinafter "Altman"), and U.S. Patent No. 5,881,105 of Balachandran et al. (hereinafter "Balachandran").

Claim 53 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of Chuang, Schuster, Altman, Balachandran, and U.S. Patent No. 6,694,155 B1 of Chin et al. (hereinafter "Chin").

Claim 55 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of U.S. Patent No. 6,044,349 of Tolopka et al. (hereinafter "Tolopka").

Claim 56 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of Tolopka, Molloy, and Agrawal.

Claim 57 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of Tolopka, Chuang, and Schuster.

Claims 61-64 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Tsujimoto in further view of Molloy and Chuang.

Claims 68 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lunby and Anvari in further view of Worthy.

Claim 70 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, and Molloy.

Claim 71 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lundby, Anvari, Chuang, and Schuster.

VII. ARGUMENT

In this section, the claims are grouped and argued as follows:

Claim 41 is argued alone, traversing the obviousness rejection under Lunby and Anvari;

Claims 42-45, 55-56, 58-60, 66, and 67-70 are argued together, traversing the obviousness rejection of the independent claims under Lunby, Anvari, and Tsujimoto (and considering the other references); and

Claims 46-54, 57, 61-65, and 71 are argued together, traversing the obviousness rejection of claims 46, 57, 61, and 71 under Lunby, Anvari, Tsujimoto, Chuang, and Schuster (and considering the other references).

REGARDING CLAIM 41

The rejection of claim 41 suffers from at least two defects: 1) a complete rejection of the claim has not been made; and 2) Lunby and Anvari fail alone or in combination to disclose or suggest the claimed invention.

Regarding point (1), Appellants point out that claim 41 recites "determining that an effective signal strength of a signal ... using signal diversity ... is insufficient to provide a desired communication range...." The Office Action fails to reject this portion of the claim. The Office Action has failed to point to anything in the cited references that is purported to disclose determining that an effective signal strength of a signal using diversity is insufficient to provide a desired communication range. Rather, the cited references make vague reference to the benefits of using signal diversity as being that diversity mitigates fading and mutual interference between signals (see Lundby at col. 3, lines 21 to 30; Anvari at col. 2, lines 45 to 50). Whether or not the references discuss the benefits of signal diversity in achieving good signal quality, the point is that claim 41 explicitly recites determining that effective signal strength is insufficient. The systems of Lunby and Anvari appear to suggest signal diversity as a manner of avoiding weak

signal strength, and make no showing that signal strength is or should be determined to determine whether to include diversity in a signal. The systems of the cited references appear to be performed ignorantly of a specific problem.

Thus, the references fail to disclose or suggest determining that an effective signal strength on a wireless communication link that is already using diversity is insufficient to provide a desired communication range. In order to provide a **prima facie case** of obviousness, as per MPEP § 2143, the Office Action must show that **each and every element of the claimed invention is disclosed by the cited references**. The Office Action has failed to meet its duty at least in failing to assert that the references disclose or suggest the cited feature of the claim. Nowhere does the Office Action point to anything in the cited references that are purported to disclose determining that an effective signal strength on a wireless communication link that is already using diversity is insufficient to provide a desired communication range, as recited in Applicants' claim. For at least this reason, the rejection of this claim in the Office Action is defective.

Regarding point (2), Appellants submit that the references fail to support the assertions made in the Office Actions, and fail to support a rejection of the claim. Put simply, the references do not stand for what is asserted in the Office Actions. And despite repeated attempts by Appellants to clarify this issue, the Office has failed to produce any meaningful reasoning or explanation grounded in technical understanding to support the position taken in the Office Actions. At this stage in the prosecution, Appellants will either hear the reasoning of the Office for the first time at either the stage of the Examiner's Answer, or the reasoning will not be given at all, depriving Appellants the opportunity to respond. Even assuming such an opportunity is given at the Examiner's Answer, Appellants should not be required to wait for Appeal for the Office to explain its rejections. See 37 CFR § 1.104. Appellants are not aware of a duty to read the Examiner's mind or guess at what the Office intended in a rejection. Where multiple, complex references are cited, as is the case here, a precise rejection supported by technical reasoning is required as the duty of the Office. See MPEP § 706.

Regarding the substance of the rejection, Appellants submit that the cited references fail to support a rejection of the claim. The Office appears to rely on Lundby at col. 3, lines 21-36 as disclosing all or most of the elements of the claim. The entirety of this portion of the cited reference is provided below:

> Antenna transmit diversity as well as multi-carrier transmission are promising new technologies that improve transmission resistance to fading by offering space and/or frequency diversity. In the antenna transmit diversity case for example, the data to be transmitted is encoded into symbols, which are then distributed among the antennas and transmitted.
>
> Many techniques have been proposed for mitigating mutual interference between signals transmitted from the different antennas. Such techniques include delay transmit diversity, orthogonal transmit diversity (OTD), time switched transmit diversity (TSTD), time delayed transmit diversity (TDTD), and multi-carrier transmit diversity (MCTD). **Each of these methods shares with the others a common goal of providing additional diversity in the transmitted signal** through space, time, frequency or code space.

Emphasis added. Appellants acknowledge the convenient recitation of the expression "providing additional diversity" in the cited reference, which at a casual glance appears to be similar to the language of the claimed invention, which recites "introducing signal diversity in an additional of the space, time, or frequency domains into the wireless communication link...." Despite the apparent similarities, Appellants submit that no reasonable interpretation of the cited reference can be made to make the disclosure of Lundby to disclose or suggest what is recited in Appellants' claim. To the contrary, one of skill in the art would understand a significant difference between the claim and the above-cited language of Lundby.

Claim 41 recites the following:

> **determining** that an effective signal strength of a signal on a wireless communication link using signal diversity in one or more of the space, time, or frequency domains is insufficient to provide a desired communication range;
>
> **introducing signal diversity in an additional** of the space, time, or frequency domains **into the wireless communication link in response to the determining** to generate multiple decorrelated signals corresponding to the signal **on the wireless communication link**; and
>
> selectively combining the decorrelated signals and demodulating the combined, decorrelated signals to generate a representation of the content of the signal.

According to the express language of the claim, the communication link is using diversity, and **additional diversity is introduced**. Thus, diversity in addition to what has already been used in then introduced as a new diversity scheme. The additional diversity is introduced "**in response** to the determining [that the effective signal strength of the signal is insufficient to provide the desired communication range]...." As Appellants have attempted to point out in previous Responses, nowhere in the cited reference is there any suggestion or consideration that

additional diversity be added to a communication link that is already using diversity. Lundby recognizes at col. 3, lines 40 to 42 that "methods for introducing diversity into a transmitted signal are almost limitless by their very nature"; however, Lundby fails to even consider **adding diversity** to a communication link that is using diversity in response to determining that the effective signal strength of a signal on the communication link using diversity is insufficient to provide a desired communication range, as recited in Appellants' claim.

The section of Lundby cited above would be understood by one of skill in the art to be made in reference to the generation of a signal (introducing diversity into the signal), which is performed in accordance with an existing diversity scheme. Significantly, Lundby fails to consider that the diversity scheme used to process the signal can be changed, and therefore introduce different diversity into the signal as has been previously done on a particular communication link. Thus, Lundby does not stand for what is asserted in the Office Action, and fails to support a rejection of claim 41.

Furthermore, Anvari is not cited for curing these deficiencies of Lundby, nor indeed does it. Anvari, as Lundby, fails to consider adding diversity to a communication link that is using diversity in response to determining that the effective signal strength of a signal on the communication link using diversity is insufficient to provide a desired communication range, as recited in Applicants' claim. That is, in the same manner as Lundby, Anvari fails to consider changing the diversity scheme applied to a communication link.

While it is true that Lundby and Anvari suggest various types of diversity, the diversity schemes in the cited references are **fixed**. Throughout the references, the assumption is that diversity may be used in a communication link, and it is suggested that multiple diversity methods may be employed on the same link, but **the same diversity scheme** is always employed on a link. Thus, the diversity scheme is fixed and does not change. Throughout Lundby and Anvari, a predetermined, fixed type of diversity is assumed. The Office has failed to point to anything in the cited references, or provide any reasoning to suggest that the diversity schemes in Lundby and Anvari are not fixed, or show anything that would suggest the diversity schemes of the cited references are changed for a communication link. Appellants note that such an argument cannot be made because no support for it exists in the references.

Coming back to a point previously raised, Applicants further observe that the expression "providing additional diversity in the transmitted signal" conveniently appears in Lundby. Col. 3,

line 35. However, the expression in that reference fails to suggest anything other than having a signal that uses multiple forms of diversity. Once again, the expression taken out of context may appear interesting on its face, but read in the light of context, the phrase would not suggest anything to one of skill in the art other than what is known and discussed in these references -that multiple types of diversity can be employed. Multiple types of diversity are explained prior to the appearance of this expression in Lundby, and the different forms are tied as having "a common goal of providing additional diversity in the transmitted signal...."

The disclosing of multiple forms of diversity **does not** constitute the disclosing or suggesting of **introducing additional diversity** into a wireless communication link **in response** to determining an effective signal strength of a signal is insufficient, as recited in claim 41, even assuming the skilled artisan were to know from Lundby that the common goal of the multiple forms of diversity is to introduce additional diversity into a transmitted signal.

As discussed above, the references, whether alone or in combination, fail to disclose or suggest at least one feature of the claimed invention, and so fail under MPEP § 2143 to support an obviousness rejection of the invention as recited in claim 41.

REGARDING CLAIMS 42-45, 55-56, 58-60, 66, AND 67-70

Appellants submit that the discussion of Lundby and Anvari above is applicable to the discussion of the rejection of these claims. As shown above, the cited references fail to support the interpretation given them in the Office Actions. The combination of references is defective at least because there is no suggestion of changing what diversity is applied to a communication link. The claims, in contrast to Lundby and Anvari, recite limitations directed to dynamically introducing additional diversity in a communication link already having diversity.

As an example, claim 42 recites the following:

> providing a wireless communication link with a level of diversity;
> detecting a degradation of signal quality on the wireless communication link; and
> **dynamically introducing additional diversity on the wireless communication link** to result in the wireless communication link having diversity in two or more of the space, time, or frequency domains in response to detecting the degradation of signal quality, to generate a plurality of decorrelated signals to be selectively combined with at least the use of a weight vector and demodulated to provide a representation of an originally transmitted signal.

Appellants have previously argued in a Response of August 8, 2006:

> Applicants note that the Office Action at page 3 refers to col. 3, lines 28 to 50 of the reference as disclosing the invention. Applicants observe that the paragraph uses the expression "introducing diversity into a transmitted signal" at lines 35 and 40 to 41. Applicants note that the expression as used in the reference refers to the fact that a signal is prepared for transmission, and then processed to be transmitted with diversity. Thus, diversity is "introduced" into the signal. However, nowhere does the Lundby reference, nor the other cited references, suggest that signals are transmitted with a particular diversity scheme, which is then changed to introduce additional diversity into the signal. In contrast to the cited references, claim 41 refers to introducing diversity in response to determining a signal is degraded, and claim 42 refers to providing a signal with a diversity level, and dynamically introducing additional diversity. Both claims recite "introducing" diversity into a signal that has a level of diversity, which may be referred to as a diversity scheme. An existing diversity scheme is dynamically changed. In contrast, the references simply suggest implementing a diversity scheme. Thus, the references fail to disclose or suggest at least one element of the claimed invention, and so fail to render obvious the invention as recited in the independent claims. The addition of the Tsujimoto reference fails to cure the deficiencies of Lundby and Anvari. As with Lundby and Anvari, Tsujimoto fails to disclose or suggest at least the claim limitation of introducing diversity in response to determining a signal is degraded, as in claim 41, or providing a signal with a diversity level, and dynamically introducing additional diversity, as in claim 42. Whether alone or in combination, the references fail to disclose or suggest at least one element of the claimed invention, and so fail to support an obviousness rejection of the independent claims under MPEP § 2143.

Appellants again submit that Tsujimoto fails to cure the deficiencies of Anvari and Lundby. Tsujimoto is not cited as curing the deficiencies of Anvari and Lundby, and instead suffers the same defect as those references. There is no teaching or suggestion of dynamically introducing diversity into an established communication link. The diversity processing of the cited references is **fixed**. That is, once a channel is established, the amount and the type of diversity do not change. The Office Actions have failed to point to anything that would suggest otherwise. Applicants have made arguments directed to such deficiencies of the references in previous Responses.

In response to Applicants' arguments, the Final Office Action at page 3 states: "Lundby et al. teach that methods for introducing diversity into a transmitted signal are almost limitless by their very nature," quoting from Lundby. Applicants note that this is a very general statement from the reference, which in no way suggests a specific method for changing a diversity scheme. The introducing of diversity in a signal is suggested to be almost limitless, because there are

many different ways to process a signal. However, what is **not** disclosed or suggests is the changing of a diversity pattern on an established communication link. In contrast, Appellants' claimed invention includes features directed to introducing additional diversity in response to the determining [that the effective signal strength of the signal is insufficient to provide the desired communication range], as in claim 41 (and similar to claim 58), and dynamically introducing additional diversity on a wireless communication link already having diversity, as in claims 42, 55, and 58 (and similar to claim 67). Thus, the Office Action fails to carry its burden of showing where each and every limitation of the claimed invention can be found in the cited references, per MPEP § 2143. Applicants again submit that the references fail to support a rejection of at least these cited features of the claimed invention.

The other references are not cited as curing the deficiencies of the primary references, and indeed fail to cure the deficiencies of the primary references as discussed above. Worthy, Molloy, Agrawal, Chuang, Schuster, Altman, Balachandran, Chin, and Tolopka are cited for various teachings, none of them related to the deficiencies of the primary references pointed out above. As Appellants have understood the references, whether or not they stand for what is asserted by the Office Actions, which Appellants do not concede, they do not cure the defect pointed out above.

Whether alone or in combination, the references fail to disclose or suggest at least one element of the claimed invention, and so fail to support an obviousness rejection of the independent claims under MPEP § 2143. The remaining claims depend from the independent claims, and so are likewise not rendered obvious by the cited references. See MPEP § 2143.03.

REGARDING CLAIMS 46-54, 57, 61-65, AND 71

Claims 46-54, 57, 61-65, and 71 are argued together, traversing the obviousness rejection of claims 46, 57, 61, and 71 under Lunby, Anvari, Tsujimoto, Chuang, and Schuster (and considering the other references).

The claims depend from independent claims discussed above, and the discussion above applies equally well to these claims as to the independent claims discussed above. Furthermore, each of these claims includes limitations directed to invoking repetition coding as a method of introducing additional diversity into an established communication link. That is, a communication operating without repetition coding can begin operating with repetition coding.

For example, a signal being transmitted with spatial diversity can have repetition coding added to provide additional diversity. Whether or not Chuang and Schuster suggest repetition coding, which Appellants need not concede, the references fail to cure the deficiencies of Lundby, Anvari, and Tsujimoto discussed above. Whether alone or in combination, the references fail to disclose or suggest at least one element of the claimed invention, and so fail to support an obviousness rejection of the independent claims under MPEP § 2143. The remaining claims depend from the independent claims, and so are likewise not rendered obvious by the cited references. See MPEP § 2143.03.

In conclusion, Appellant respectfully submits that all appealed claims in this application are patentable and requests that the Board of Patent Appeals and Interferences overrule the Examiner and direct allowance of the rejected claims.

A single copy of this correct brief is submitted as per 37 C.F.R. §41.37(a). Appellant believes that no fee is required, as the fee of $500.00 to cover the appeal fee for one other than a small entity as specified in 37 C.F.R. §1.17(c) was submitted with the originally filed Brief. Please charge any shortages and credit any overcharges to our Deposit Account No. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP

Date: October 15, 2007

/Vincent H. Anderson/
Vincent H. Anderson
Reg. No. 54,962
Attorney for Applicant

1279 Oakmead Parkway
Sunnyvale, CA 94085-4040
(503) 439-8778

IX. CLAIMS APPENDIX

1-40. (Canceled)

41. (Previously Presented) A method comprising:

determining that an effective signal strength of a signal on a wireless communication link using signal diversity in one or more of the space, time, or frequency domains is insufficient to provide a desired communication range;

introducing signal diversity in an additional of the space, time, or frequency domains into the wireless communication link in response to the determining to generate multiple decorrelated signals corresponding to the signal on the wireless communication link; and

selectively combining the decorrelated signals and demodulating the combined, decorrelated signals to generate a representation of the content of the signal.

42. (Previously Presented) A method comprising:

providing a wireless communication link with a level of diversity;

detecting a degradation of signal quality on the wireless communication link; and

dynamically introducing additional diversity on the wireless communication link to result in the wireless communication link having diversity in two or more of the space, time, or frequency domains in response to detecting the degradation of signal quality, to generate a plurality of decorrelated signals to be selectively combined with at least the use of a weight vector and demodulated to provide a representation of an originally transmitted signal.

43. (Previously Presented) A method according to claim 42, wherein the wireless communication link comprises an uplink to a communication station.

44. (Previously Presented) A method according to claim 42, wherein detecting the degradation of signal quality on the wireless communication link comprises determining that a signal quality characteristic of the wireless communication link has achieved a threshold value associated with the characteristic.

45. (Previously Presented) A method according to claim 44, wherein the signal quality characteristic includes one or more of a receive signal strength, a signal to noise ratio (SNR), a bit error rate (BER), a frame error rate (FER), signal to noise and interference ratio (SINR), or a carrier to interference ratio (CIR).

46. (Previously Presented) A method according to claim 42, wherein introducing additional diversity comprises:

communicating on a first channel of the wireless communication link;

determining whether a second channel is available on the wireless communication link to support repetition coding; and

invoking repetition coding to transmit a repetition coded signal on the first channel and on the second channel of the wireless communication link to provide channel diversity.

47. (Previously Presented) A method according to claim 46, wherein a channel is a timeslot on a particular carrier frequency.

48. (Previously Presented) A method according to claim 47, further comprising:

introducing frequency diversity in the repetition-coded signal, wherein each timeslot is dynamically assigned to an independent carrier frequency.

49. (Previously Presented) A method according to claim 46, wherein determining whether a second channel is available comprises determining whether a timeslot is available to support repetition coding.

50. (Previously Presented) A method according to claim 46, wherein introducing additional diversity further comprises:

enabling receipt of a signal via multiple channels and multiple receive paths.

51. (Previously Presented) A method according to claim 50, wherein enabling receipt via multiple receive paths comprises:

receiving the signal through multiple antenna elements.

52. (Previously Presented) A method according to claim 50, wherein the signals to be selectively combined comprises a receiving component of the wireless communication link:

performing initial spatial processing on a first channel by adding energy of signals associated with the channel via the multiple receive paths to form a composite signal of the associated signals;

performing an error control check on the composite signal; and

combining spatially processed composite signals associated with each of the channels including the repetition coded signal if the error control check on the composite signal fails.

53. (Previously Presented) A method according to claim 52, wherein spatial processing comprises:

combining each spatially diverse signal representation of the channel received from the multiple receive paths utilizing maximal ratio combining (MRC).

54. (Previously Presented) A method according to claim 52, wherein the error control check comprises:

demodulating the composite signal;

extracting error control information from at least a subset of the demodulated signal; and

performing a cyclical redundancy check (CRC) using the error control information to determine whether the demodulated signal matches an originally encoded signal.

55. (Previously Presented) An article of manufacture comprising a machine accessible storage device having a plurality of executable instructions which, when executed, cause the executing machine to perform operations including:

providing a wireless communication link with a level of diversity;

detecting a degradation of signal quality on the wireless communication link; and

dynamically introducing additional diversity on the wireless communication link to result in the wireless communication link having diversity in two or more of the space, time, or frequency domains in response to detecting the degradation of signal quality, to generate a

plurality of decorrelated signals to be selectively combined with at least the use of a weight vector and demodulated to provide a representation of an originally transmitted signal.

56. (Previously Presented) An article of manufacture according to claim 55, wherein detecting the degradation of signal quality on the wireless communication link comprises determining that one or more of a receive signal strength, a signal to noise ratio (SNR), a bit error rate (BER), a frame error rate (FER), signal to noise and interference ratio (SINR), or a carrier to interference ratio (CIR) of the wireless communication link has achieved a threshold value associated with the characteristic.

57. (Previously Presented) An article of manufacture according to claim 55, wherein introducing additional diversity comprises:

communicating on a first channel of the wireless communication link;

determining whether a second channel is available on the wireless communication link to support repetition coding; and

invoking repetition coding to transmit a repetition coded signal on the first channel and on the second channel of the wireless communication link to provide channel diversity.

58. (Previously Presented) A wireless communication system element comprising:

a transceiver to establish a wireless communication link over which to transmit and receive wireless communication signals in a wireless communication session with a different system element; and

a multidimensional diversity agent, coupled to the transceiver, to detect a degradation of signal quality on the wireless communication link, and in response to detecting the degradation of signal quality, selectively introduce additional diversity on the wireless communication link to result in the wireless communication link having diversity in two or more of the space, time, or frequency domains to generate a plurality of decorrelated signals, to selectively combine with at least the use of a weight vector the decorrelated signals, and to demodulate the combined signals to provide a representation of an originally transmitted signal.

59. (Previously Presented) A wireless communication system element according to claim 58, wherein the system element is a communication station, and wherein the additional system element is a subscriber unit.

60. (Previously Presented) A wireless communication system element according to claim 58, wherein the agent to detect the degradation of signal quality on the wireless communication link comprises the agent to determine that one or more of a receive signal strength, a signal to noise ratio (SNR), a bit error rate (BER), a frame error rate (FER), signal to noise and interference ratio (SINR), or a carrier to interference ratio (CIR) of the wireless communication link has achieved a threshold value associated with the characteristic.

61. (Previously Presented) A wireless communication system element according to claim 58, the agent to introduce additional diversity comprises the agent to:

determine whether an additional channel is available on the wireless communication link to support repetition coding; and

invoke repetition coding to transmit a repetition coded signal on the additional channel to provide channel diversity with an original communication channel on the wireless communication link.

62. (Previously Presented) A wireless communication system element according to claim 61, wherein a channel is a timeslot on a particular carrier frequency, the agent to further:

introduce frequency diversity in the repetition-coded signal, wherein each timeslot is dynamically assigned to an independent carrier frequency.

63. (Previously Presented) A wireless communication system element according to claim 61, wherein the agent to determine whether an additional channel is available comprises the agent to determine whether a timeslot is available to support repetition coding.

64. (Previously Presented) A wireless communication system element according to claim 61, wherein the agent to introduce additional diversity further comprises the agent to:

enable receipt of a signal via multiple channels and multiple receive paths corresponding to multiple antenna elements.

65. (Previously Presented) A wireless communication system element according to claim 64, wherein the agent to selectively combine the signals comprises the agent to:

perform initial spatial processing on a first channel by adding energy of signals associated with the channel via the multiple receive paths to form a composite signal of the associated signals;

perform an error control check on the composite signal; and

combine spatially processed composite signals associated with each of the channels including the repetition coded signal if the error control check on the composite signal fails.

66. (Previously Presented) A wireless communication system element according to claim 58, wherein the system element is a subscriber unit, and wherein the additional system element is a communication station.

67. (Previously Presented) A method comprising:

determining that an effective signal strength of a signal on a wireless communication link using a level of signal diversity is insufficient to provide a desired communication range for the signal on the wireless communication link; and

dynamically introducing an additional level of signal diversity into the wireless communication link in response to determining that the effective signal strength of the signal is insufficient, to generate additional decorrelated signals corresponding to the signal on the wireless communication link that provides a representation of the content of the signal to a receiver.

68. (Previously Presented) A method according to claim 67, wherein the wireless communication link comprises an uplink communication link to a communication station.

69. (Previously Presented) A method according to claim 67, wherein the level of signal diversity comprises diversity in one or more of space, time, frequency, or code.

70. (Previously Presented) A method according to claim 67, wherein determining that the effective signal strength of the signal is insufficient further comprises measuring one or more signal quality characteristics selected from the group consisting of: a receive signal strength, a signal to noise ratio (SNR), a bit error rate (BER), a frame error rate (FER), signal to noise and interference ratio (SINR), or a carrier to interference ratio (CIR).

71. (Previously Presented) A method according to claim 67, wherein introducing an additional level of diversity comprises:

communicating on a first channel of the wireless communication link;

determining whether a second channel is available on the wireless communication link to support repetition coding; and

invoking repetition coding to transmit a repetition coded signal on the first channel and on the second channel of the wireless communication link to provide channel diversity.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.